

Localized Mercury Bioaccumulation Study

Results and Policy Implications

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Multi-disciplinary Project Team

Project Team

- Larry Walker Assoc.
- Univ. of California, Davis
- Applied Marine Science
- SRCSD lab
- Caltest Analytical Labs
- Studio Geochimica
- SRCSD →

Technical Advisors

- Cindy Brown, USGS
- Brock Bernstein, indep.
- Robert Mason, U Conn.



Outline

- Regulatory Context & Purpose of Study
- Monitoring Overview
- Results
- Conclusions

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AVISO WARNING BABALA

अडवार्सिंग

Health Advisory for Striped Bass and Sturgeon

<p>Women age 18-45, Breastfeeding or Pregnant women, Children and teens</p>	<p>1 MEAL A MONTH</p>	<p>NO Striped Bass over 27 inches</p>
<p>Other Adults</p>	<p>2 MEALS A MONTH</p>	<p>NO Striped Bass over 35 inches</p>

Some Chemicals

Less Chemicals

БНМААНЭИ

警告事項

EAT DELTA FISH SAFELY

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A Gold Rush Legacy

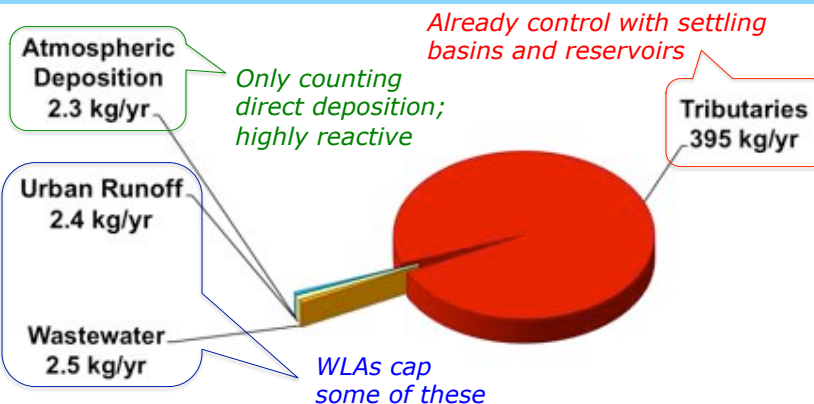


Sierra Nevadas:
Hydraulic mining

Coastal Range:
Mercury mining and
processing

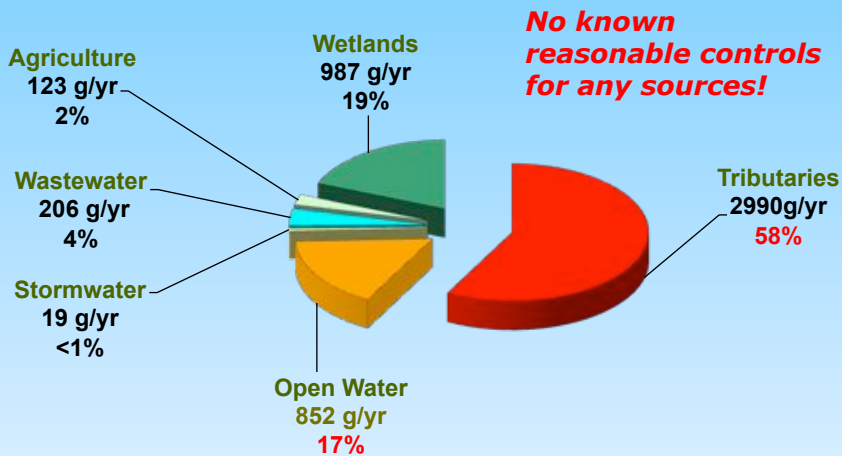


Total Mercury Sources to the Delta



Reference: Basin Plan Amendment for Methyl and Total Mercury in the Sacramento-San Joaquin Delta Estuary, February 2008

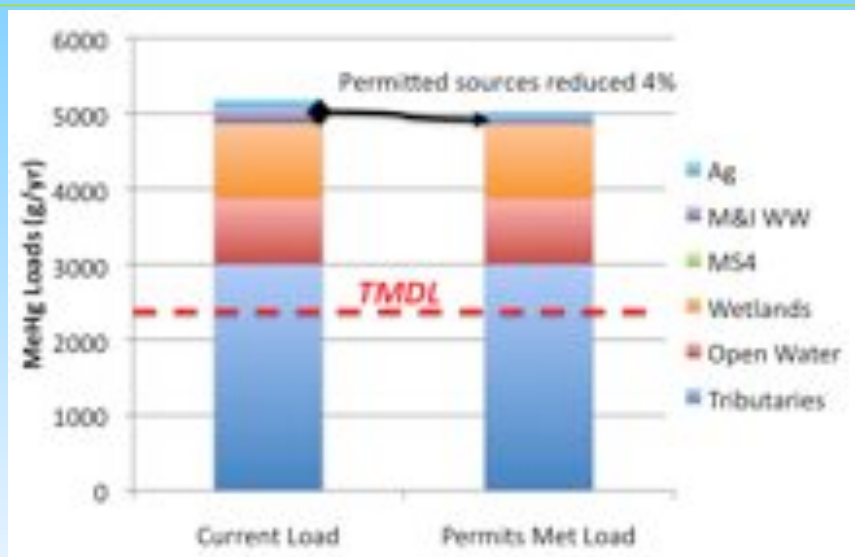
Methylmercury Sources to the Delta



Reference: Basin Plan Amendment for Methyl and Total Mercury in the Sacramento-San Joaquin Delta Estuary, February 2008

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How TMDL Loads and Allocations Stack Up



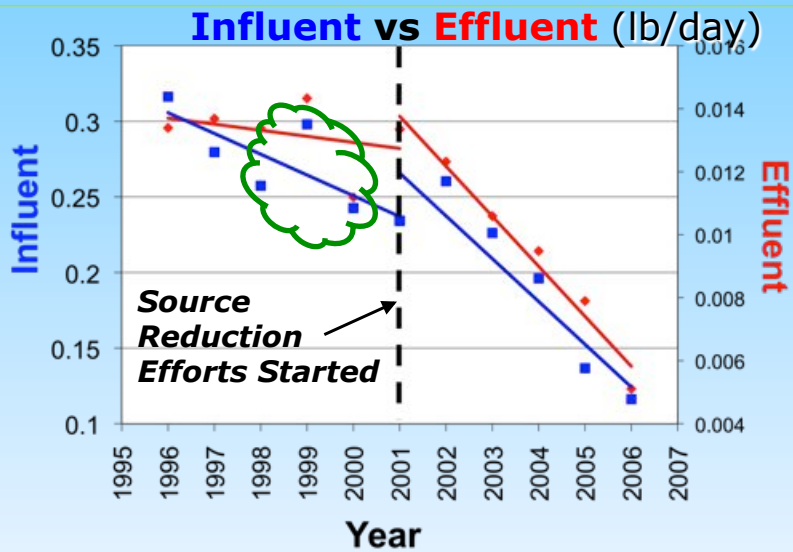
Mercury Control Options



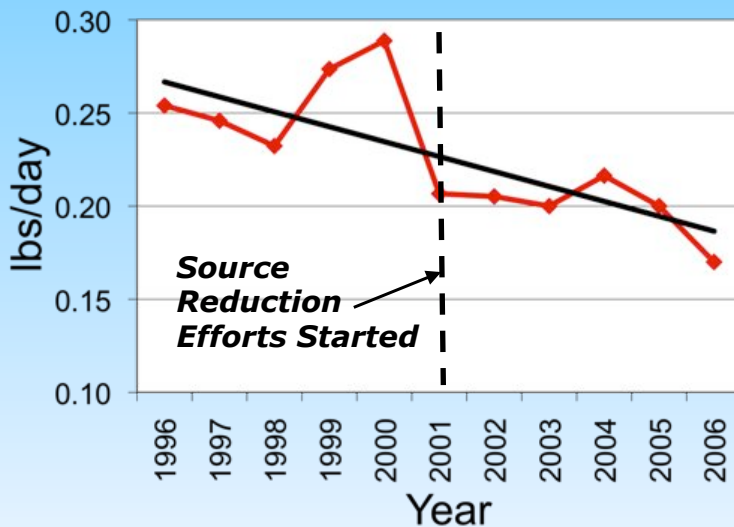
- Source Control
- Treatment Control
- Watershed Projects

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Source Reduction Benefits?

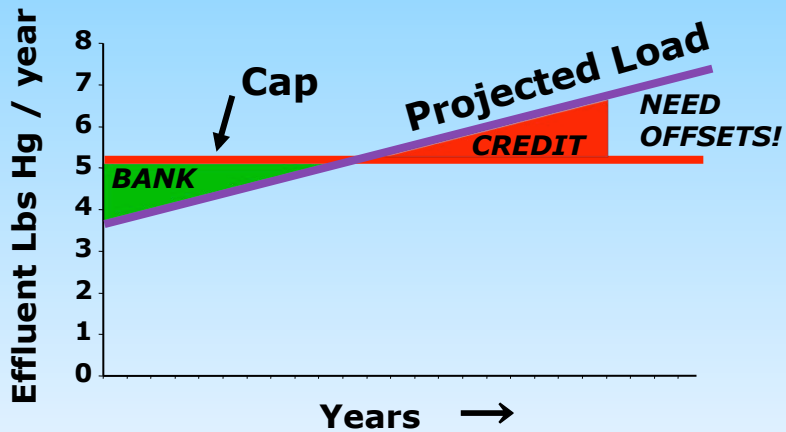


Even Reduced in Biosolids



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Mercury Regulation: Load Cap



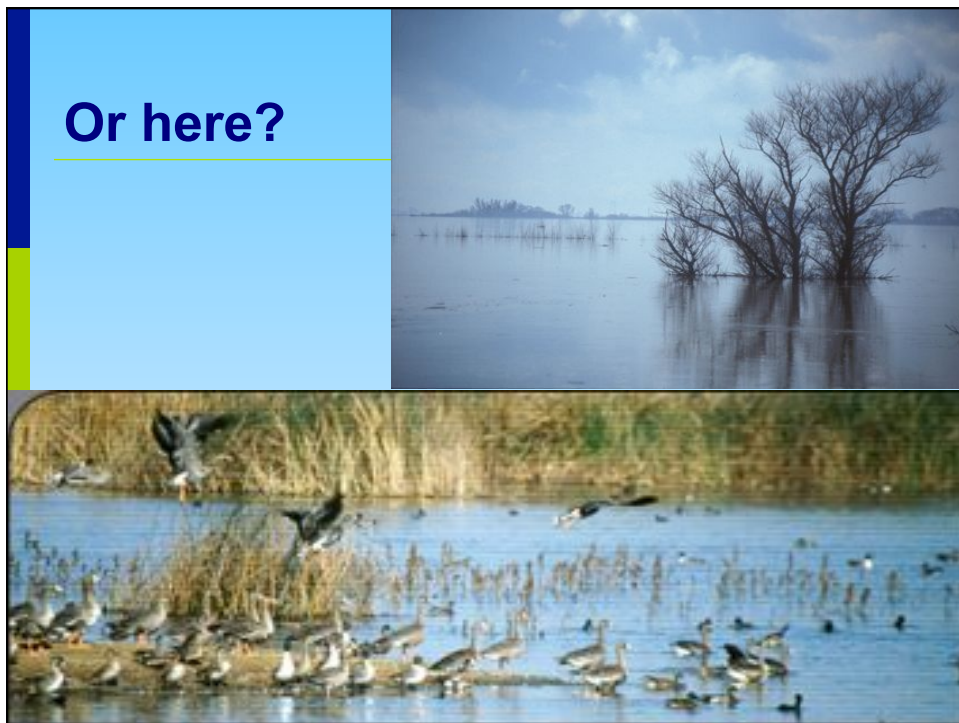
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An “Offset” Is...

A regulatory compliance option where implementation of a pollutant reduction project in the watershed is traded, in this case, for an expanded discharge

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Study Purpose

- Understand the nature and extent of **mercury** in the District's effluent discharges and its effects on **localized bioaccumulation** in the Sacramento River
- Understand angler activity & **fish consumption**; communicate with local community members
- Use that understanding to **guide District and regulatory policy** (TMDLs, trading)

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Is Effluent Creating a Hot Spot??

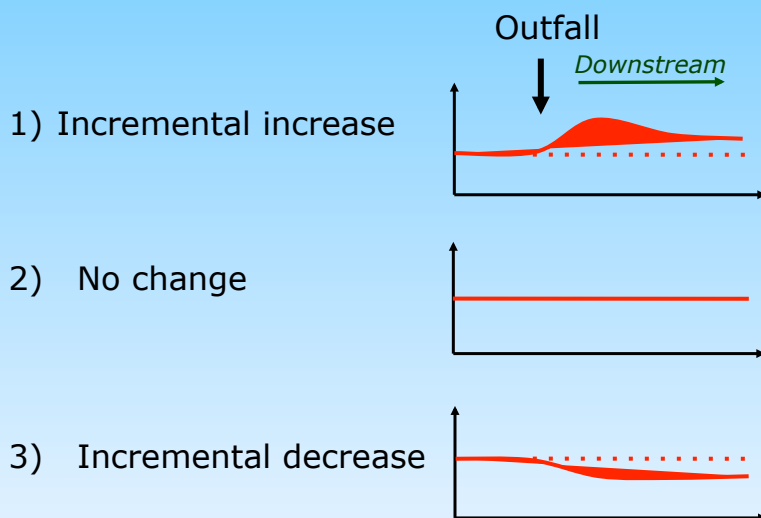
Technical: Methylmercury in bioindicator organisms (**clams & fish**) does not vary **upstream vs. downstream**

AND

Policy: Reasonable decision makers would conclude “some action must be taken locally before considering offsets”

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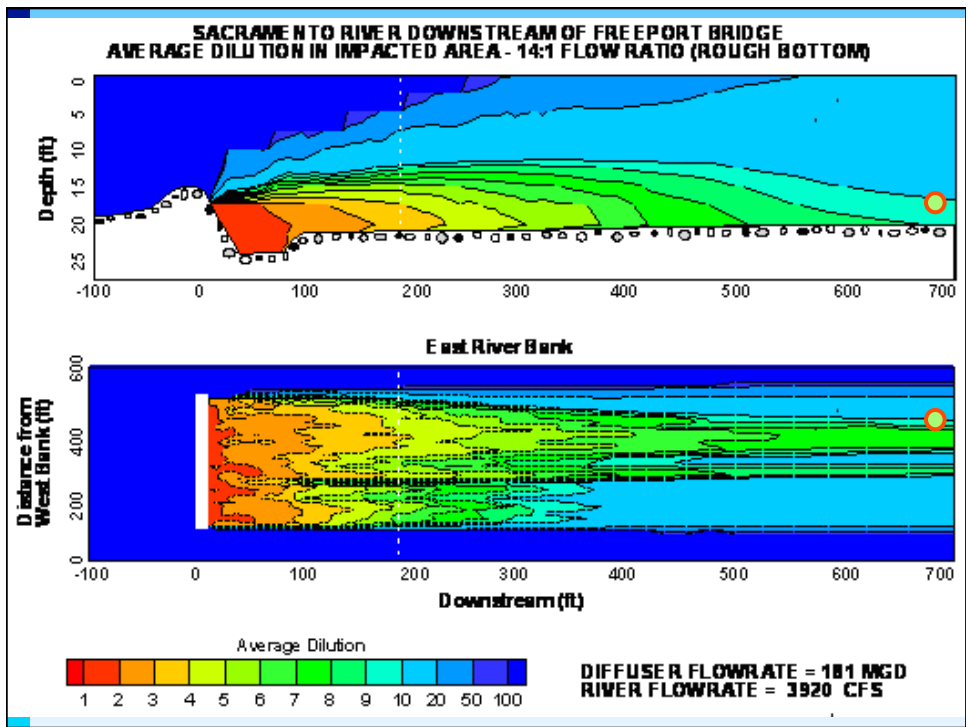
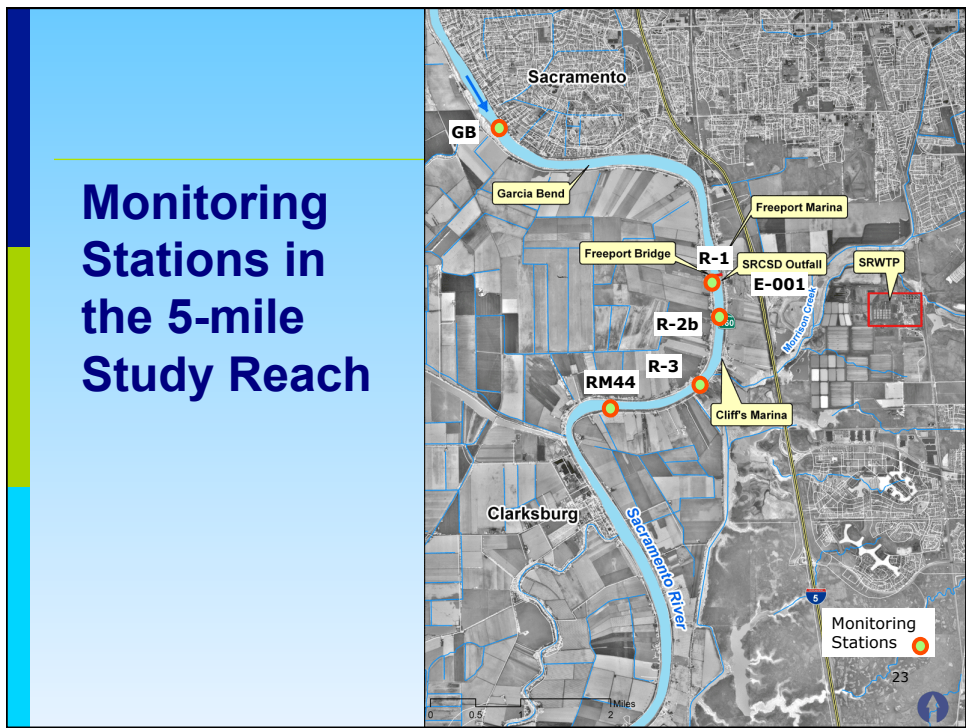
Potential Local Effects



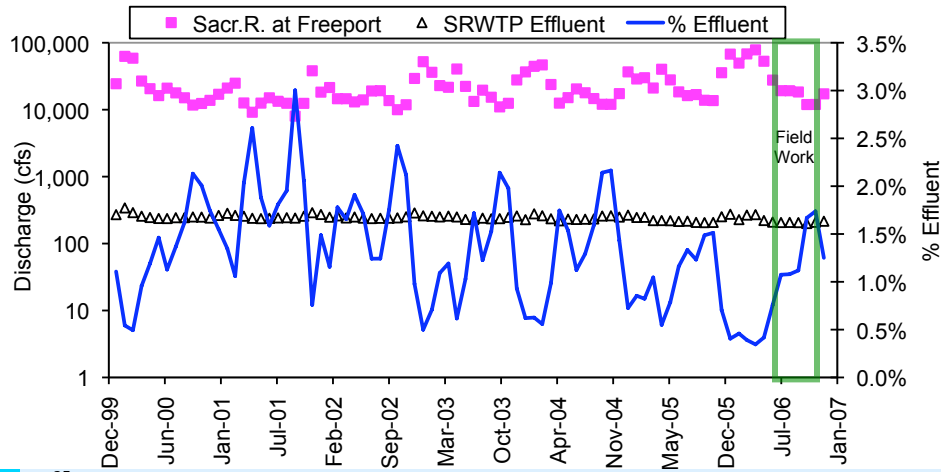
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Where in the World...

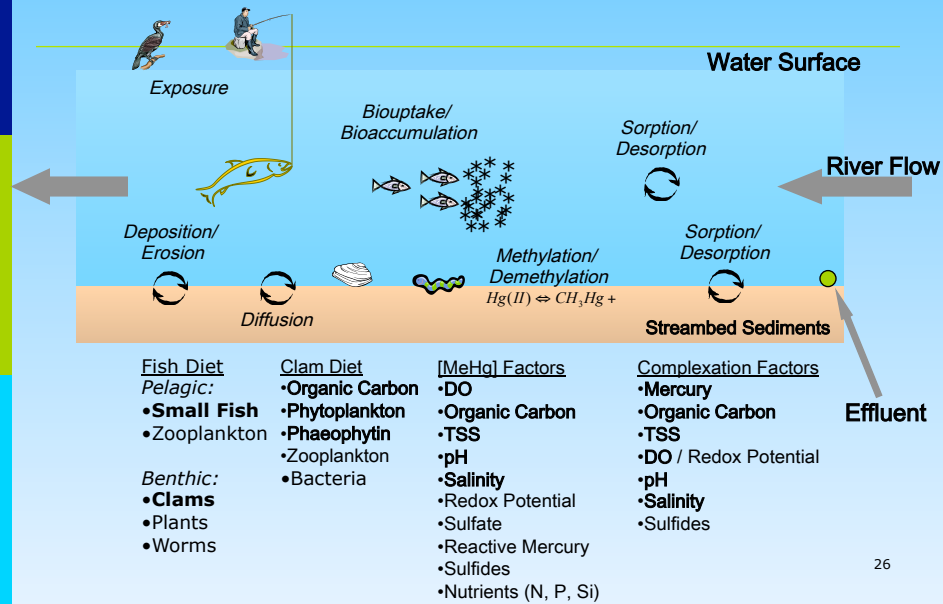




River and Effluent Discharges – Field Work Context



Conceptual Model



Major Design Points

1. Monthly sampling during dry season (July – November, 2006)
2. Focus on resident & transplanted clams, and “biosentinel” fish
3. Multi-media
 - Riverbed
 - Water column
 - Effluent
 - Microseston
 - Clams
 - Fish

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Clam Cages

- *Corbicula fluminea* “asiatic clam”
- >3000 resident clams
- >4000 transplanted among 5 stations (from u/s site)



Biosentinel Sampling Techniques



Boat Electroshocking



MS Silverside



Field cleaning, sorting, packing



Field freezing on dry ice

Environmental Justice Component – Local Survey

- Who is fishing in the reach?
- What are they fishing for?
- What and how much are they (and their families) eating?
- What do they know about advisories?

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Outreach and Education

- Training staff, building local capacity
- Informational meetings

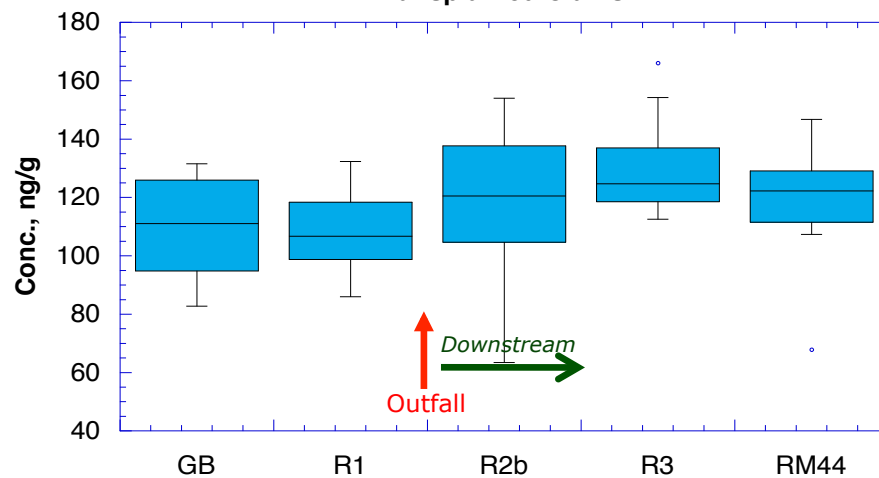


Outline

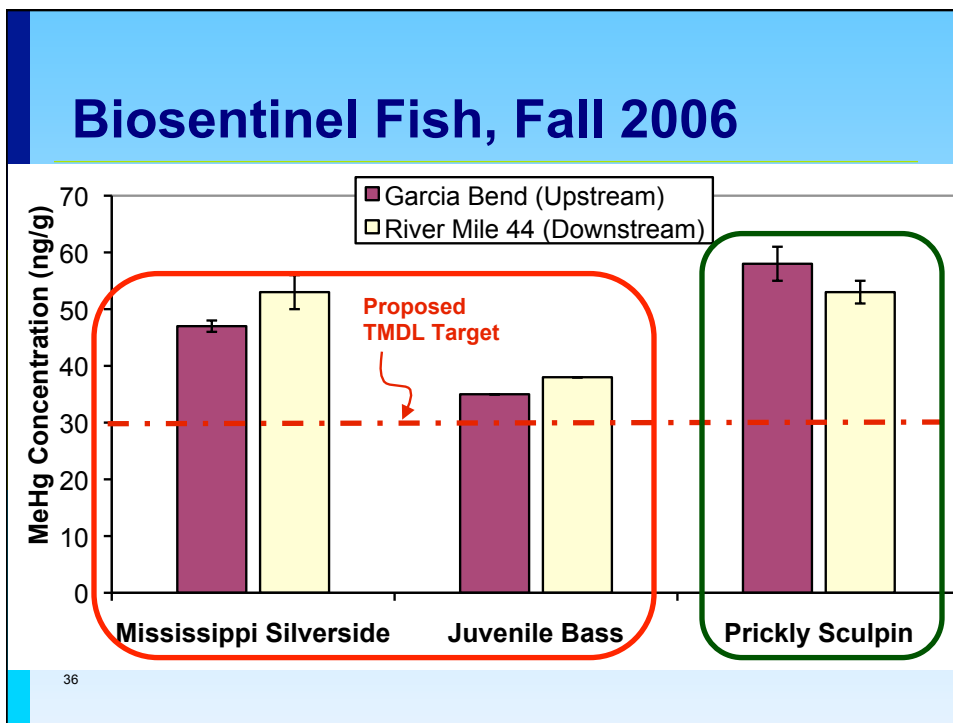
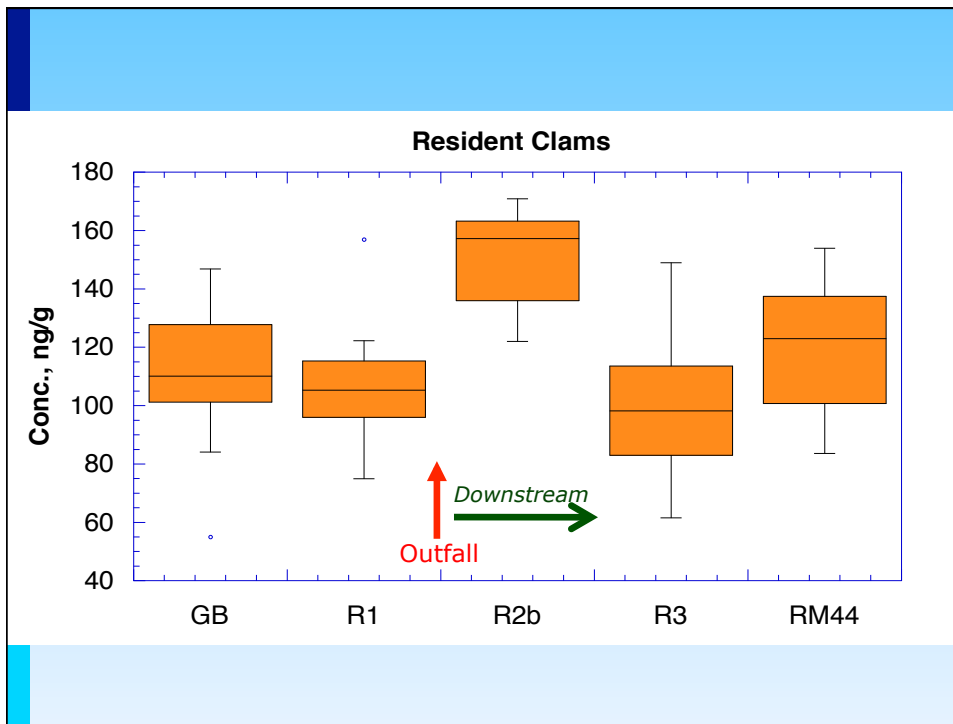
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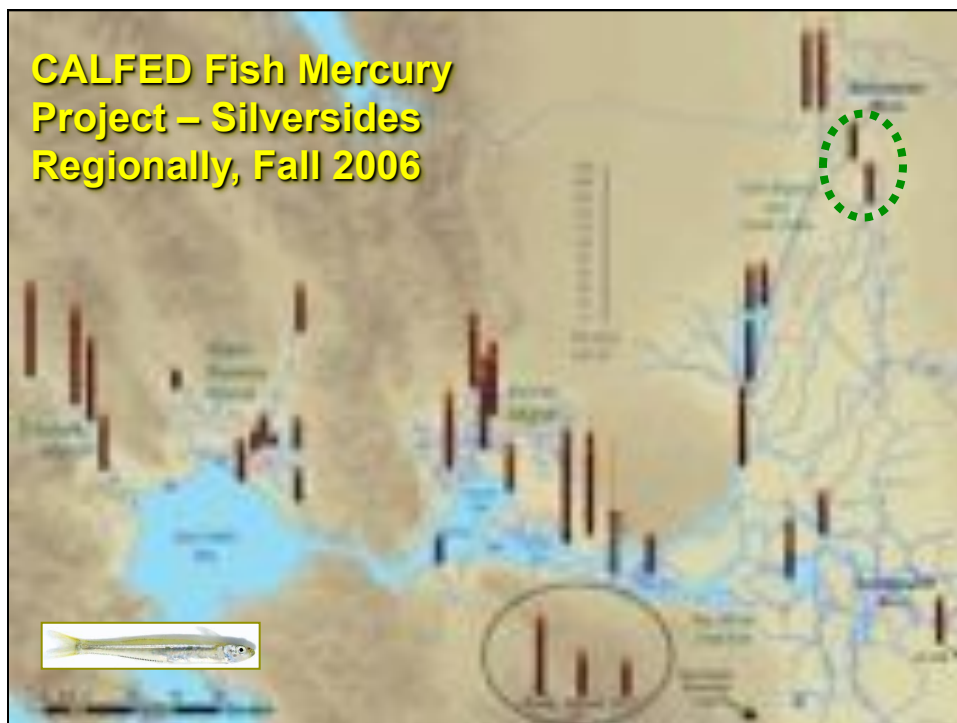
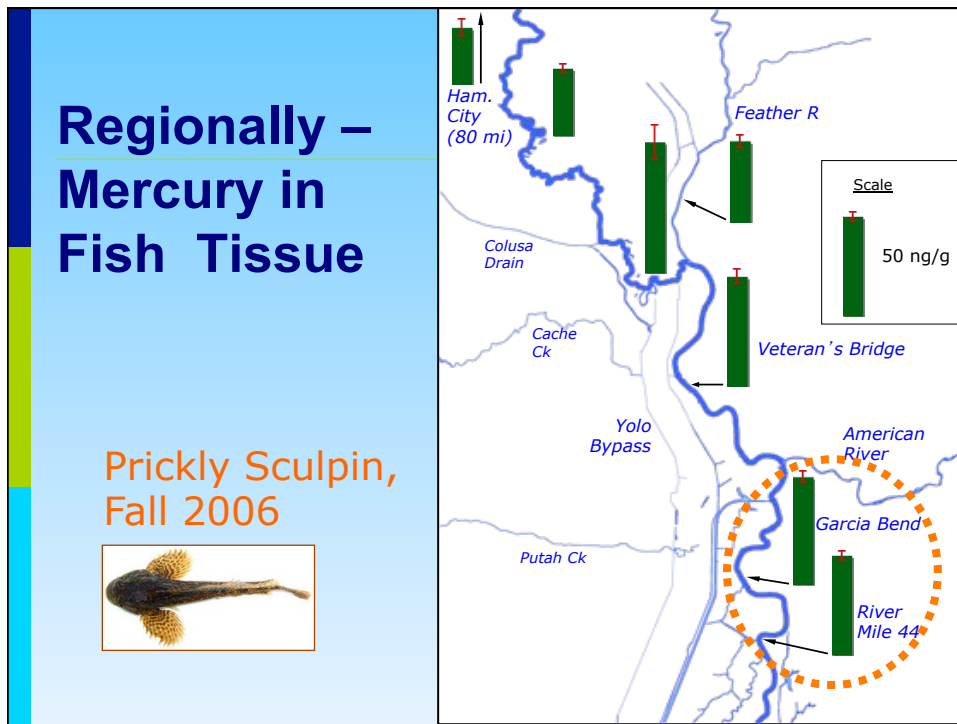
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Transplanted Clams



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Conclusions

- SRCSD discharge is not causing a localized hot spot during critical low river flow period
- Levels of mercury in sentinel fish downstream from SRCSD discharge are not elevated compared to other watershed or Delta locations
- Reductions in MeHg levels in SRCSD would not be expected to produce a significant benefit in Delta fish (nor would increases cause significant detriment)

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Report Availability

- Website: www.bemercuryfree.net
- Hard copy: Contact Stephen McCord, LWA
- Email: sam@lwa.com